PROBLEM-SOLVING IN ENVIRONMENTAL GEOLOGY:
CURRICULAR DEVELOPMENT AT KENT STATE UNIVERSITY (1990-1995)

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Technique Keywords: nutrient analysis, grant writing

Pedagogy Keywords: student-centered learning, student responses

Overview: Ms. Mattevi revised an Environmental Geology course so that teams of students collected and analyzed water quality data, gave written and oral reports, allocated “funds” for remediation, and interviewed local experts about the problems of sediment and nutrient loading into a local lake. She wrote grants to support the course and shared ideas with local teachers.

Introduction

The Environmental Geology course at Kent State Salem involves students with variable backgrounds and abilities. The problem-solving sequence introduced at the Great Lakes Research Consortium’s Ecosystem Dynamics program in 1990 seemed ideal to keep students at these various levels interested and participating by relating geology to local political and social decisions. The main goal of the sequence was to teach geology through direct student involvement. The specific problem was introduced in a five-week unit as a study of land use contributions to water quality and eutrophication in a local lake.

Kent State University is a large state university with seven regional campuses. The regional campuses offer general courses for students who will go on to the main Kent campus for 4-year degrees, as well as a variety of 2-year associate degrees. Environmental Geology is a one semester, 3-credit hour course that fulfills a science component of the Liberal Education requirement for both A.S. and B.S. students. It has no prerequisites and no laboratory. There were 27 students in the class in the spring semester of 1991. Most were majors in Human Services Technology, Business Technology, or Education. Many had little science background. About one-third of the class were non-traditional students.

The course was divided for convenience into three units (Appendix 1). The first unit consisted of introductory geology material, including earth resources, extraction and use, and internal processes such as volcanoes and earthquakes. The second unit emphasized surface processes such as stream erosion, flooding, pollution, and soil processes; this section provided background material for the problem solving. The third unit included the actual problem-solving exercise, including guest lecture, field trip, and oral presentations; in addition the unit touched on global environmental problems.
Activities

Guilford Lake Problem Solving

The central problem involved comparisons of stream quality from different types of land use. Students chose a land use type, forming groups of about four each; each group was assigned a field site representative of that land use. The land uses included an unreclaimed surface mine, a wetland, a village with outdated septic systems, an agricultural feed lot, and a construction area. All except the mine are within the watershed of Guilford Lake, a state park primarily used for recreation, which is experiencing use impairment due to eutrophication and sedimentation. The mine is near the lake, and represents an older mine, now reclaimed. The actual problem involved rough benefit-to-cost analyses of controlling of sediments and excess nutrients from each type of land use and a decision by the class to allocate hypothetical money for remediation. A detailed description of the problem is given in Appendix 2.

It was necessary to assign additional groups due to the large size of the class. These groups mainly provided background research and did not have field sampling stations, but were paired with those who did. Topics included the Salem water supply, Guilford sewage treatment plant, eutrophication, and the Nease site, a Superfund site that has contaminated a stream with mirex and other chemicals. These sites are all near Guilford Lake and involve more complex issues of land use, water quality and politics within the area. For example, a proposed extension of the Guilford sewer line will include Winona, the rural area sampled by the field group, and an extension of the Salem water supply is proposed to include water from Guilford Lake.

Advance preparation for the unit involved making a file of information for student research. This was necessary both because the inter-library loan system which connects Salem campus and the Kent campus is somewhat cumbersome, especially to students with limited background, and because much of the information is unpublished. In addition, contacts were made with local officials describing the unit and requesting that they speak to the students in telephone interviews later in the semester. All were very co-operative, and many contributed information for the file or helped to arrange access for field sampling. The assistance of Alan Gatchel, Manager at Guilford Lake, and Mitch Cattrell, from the Soil Conservation Service, were absolutely indispensable in the project.

Introduction of the problem to the students was included during the first course unit. A brief description of lake eutrophication and the relationships of land use was followed by circulation of a sheet containing the topic choices; students were allowed to choose their own topics. After the original selection, there was minor reorganization based on individual abilities and schedules. The information file was made available at that time. Students were informed that they would be giving a group oral presentation, as well as an individual written report. During the second unit, discussion of surface processes included examples from the Guilford Lake watershed. A list of specific suggestions for breaking down the group topic into individual sections, as well as phone numbers of informed contacts, was given before the semester break.

The unit was introduced with a guest lecture by the park manager, who described the effects of eutrophication and sedimentation on water quality and lake use. Excess sedimentation has caused decreased access to sections of the lake, necessitating occasional weed harvesting and proposed dredging to deepen some portions. The next class period was taken up by the field trip. We visited Guilford Lake, the Guilford sewage treatment plant, and the Salem water pumping
station, as well as each of the field sites. Students measured instantaneous stream discharge and pH at each sampling station, made general observations of land use and water quality, and took samples which were later analyzed for total suspended solids. Another sample was placed in a 1-gal glass jar under constant grow lights as a simulation of algae growth in the lake. At the end of the unit, a qualitative comparison of algae growth and water clarity yielded a rough estimate of excess nutrients. This proved to be a very visual experiment that impressed the students. The biology department assisted in culturing the sample from Winona; agar smears identified the presence of *E. coli*, also a very visual test that demonstrated adverse stream quality.

During the remainder of the last unit, the beginning of each class was devoted to summarizing field observations, discussing land use relationships and potential remediation methods, and comparing algae growth; time was also allowed for questions about the report. The remainder of class time touched on some global environmental problems. These chapters are well developed in the text, and students were informed that they would be responsible for learning portions of the material on their own.

Oral group presentations were given the last two days of the course. Each group emphasized how their particular land use impacted water quality and gave some methods for minimizing contributions of excess nutrients and sediment from that land use. Some groups obviously spent more time on the reports than others. Several had returned to their sites to take slides or videotapes, and most interviewed landowners and local officials about land use, water quality, and proposed sewer or water line extensions. Others gave disappointingly brief reports. Written reports were also turned in at this time. Field observations and measurements were included in both oral and written reports.

The reports culminated with a short exercise in which the class allocated a hypothetical $100,000 for remediation of land use contributions to stream and lake quality problems. As essay test evaluated the students’ comprehension of relationships of land use and stream quality.

Class Reactions to Problem-Solving

Reactions of the students to the unit were predictably variable, as determined by an evaluation sheet given after the test. Thankfully, the students were fairly unanimous in agreeing that the unit increased their understanding of geology and helped them learn more about the environment than they would have without the problem-solving exercise; these were the main goals of the unit and they seem to have been accomplished. However, the actual group exercise itself had some severe critics. Three people were totally opposed to the field trip itself, partially because of the extra time involved, although most said the trip was valuable and helped them see the relationships of the sites to each other. Many had problems in working within the group, and there were some severe failures to communicate within and between the groups. One suggestion was that all group work as well as the field trip be accomplished solely during class time. Other criticisms involved the group grade for the oral report; all resented their grade being dragged down by the inferior work of others. On the positive side, most recognized the value of communicating directly with local officials and felt they understood the relationships of political decisions, such as extending the Winona sewer line, and the environment.

In my opinion, the unit was successful. It accomplished the main goal of teaching geology to non-science majors, and made the subject seem very dynamic and real to them. It also generated a great deal of support both from the class and other faculty, as well as from the community.
Nearly all people approached were eager to assist the project, and the contacts made by the students and me contributed to increased public awareness of the university. Most test scores were higher on the last test, which covered the Guilford problem, than on earlier tests, and students seemed to demonstrate a more sophisticated understanding of the material on that test. However, overall course grades were not much different than in previous years, with the exception of the lack of very low grades; a “C” was the lowest grade this year.

Two very exciting developments occurred because of student involvement in this unit. The first was a request by the developers of the construction area for the students to write a list of suggestions for minimizing soil erosion during construction. These will be incorporated into a brochure given to prospective property owners at the site. In addition, other students volunteered for a state lake monitoring program and will be taking Secchi disk readings at Guilford Lake throughout the summer.

Problems and Solutions

Problems with group dynamics were the largest obstacle to enthusiasm both for the students and me. Unfortunately, it appears likely that this is a perennial problem with no easy solution, or perhaps no solution at all. Other problems were the poor utilization of file materials and lack of detailed field data. Analyses of some stream sites were in the file, as well as maps, air photos, and representative analyses from other streams and information about cost of remediation measures; none of these were used by the students, despite repeated references to the file. In the future, more class time will be spent with examples of cost analysis as well as with existing stream data. There is also a possibility of a grant to expand the field analyses for further comparisons. The computer simulations originally proposed for the class did not prove usable, but perhaps in the future a simple model could be included. Material from the volunteer lake-monitoring program, even though it is not detailed, will aid in developing continuity of the course from this year to next year.

Grant Applications

I have submitted several grant proposals and led a workshop to develop curricula and disseminate information based on the GLRC-ED program (Appendices 3-5). The Ohio Environmental Education Fund grant funded curricular development for implementation of the problem-solving unit in Environmental Geology, including sample analyses costs, printing a student-generated pamphlet, and personnel assistance in developing outdoor laboratory at local public schools. The main goals of the project were to develop college curricula to teach Environmental Geology through actual field study of a local problem area and to apply those curricula to teacher education classes and individual outreach contacts. A secondary goal is to educate the public by student research and presentations. Objectives included increased understanding of environmental concepts by college students, primary and secondary teachers, and the public, improved curricula which interests students in environmental science at all ages, and increased public awareness of the relationship between individual actions and water quality. Activities included coursework that emphasizes local application of geologic principles, field trips where data is collected, and interpretation of that data as part of course content. Students wrote and published an informational brochure emphasizing land use and water quality with emphasis on non-point source pollution and watershed protection. Teachers were exposed to these curricula with individual outreach assistance to develop environmental education experiences in their own areas.
A 2-credit hour workshop presented the concept of a problem-solving approach to ten area public school teachers during the summer of 1992. Stream sample analyses were funded by the OEEF grant (see above) and were included in later Environmental Geology class projects and published reports.

A grant to fund capital improvements improved access to the Outdoor Classroom facility at Kent State Salem; a sampling platform and boardwalks were installed and are used by college and visiting public school classes. These additions enhance the facility that already includes a 3.5 acre pond, natural forest, arboretum, and demonstration plantings.

Conclusions

The Problem-solving unit for Environmental Geology was an overall success, proving to be a dynamic way to introduce geology to students with little science background. It will be continued in the spring semester of 1992 with some modification of the schedule and some consolidation of the groups. The unit will be started earlier in the semester and more time will be allowed for group oral reports and discussion. At least one other class session will be devoted to fieldwork, thus allowing more time at the lake. The original field groups will be retained, with specified background material included as part of the group report, and more class time will be devoted to group communication. An additional geology course scheduled for the fall semester of 1992 will incorporate many of the concepts introduced in the spring semesters.
## Appendix 1

### Environmental Geology Schedule

**Text:** Montgomery, C. W., 1989, Environmental Geology

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 14</td>
<td>Introduction; portions of Chapt. 1, 2, 3</td>
</tr>
<tr>
<td>16</td>
<td>Plate Tectonics, Chapt. 4; Earthquakes, Chapt. 5</td>
</tr>
<tr>
<td>21</td>
<td>Martin Luther King Day; no class</td>
</tr>
<tr>
<td>23</td>
<td>Earthquakes, Chapt. 5</td>
</tr>
<tr>
<td>28</td>
<td>Volcanoes, Chapt. 6</td>
</tr>
<tr>
<td>30</td>
<td>cont.</td>
</tr>
<tr>
<td>Feb. 4</td>
<td>Resources, Chapt. 13</td>
</tr>
<tr>
<td>6</td>
<td>Energy, Chapt. 14</td>
</tr>
<tr>
<td>13</td>
<td>Test I</td>
</tr>
<tr>
<td>18</td>
<td>Streams and Flooding, Chapt. 7</td>
</tr>
<tr>
<td>20</td>
<td>cont.</td>
</tr>
<tr>
<td>25</td>
<td>Water as a Resource, Chapt. 11</td>
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<tr>
<td>27</td>
<td>cont.</td>
</tr>
<tr>
<td>Mar. 4</td>
<td>Water Pollution, Chapt. 17</td>
</tr>
<tr>
<td>6</td>
<td>cont.</td>
</tr>
<tr>
<td>11</td>
<td>Soils, Chapt. 12</td>
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<tr>
<td>13</td>
<td>cont.</td>
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<tr>
<td>18</td>
<td>Landslides, Chapt. 9</td>
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<td>20</td>
<td>Test II</td>
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<td></td>
<td>spring break; Mar. 25-29</td>
</tr>
<tr>
<td>Apr. 1</td>
<td>Shorelines, Chapt. 8</td>
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<tr>
<td>Guest speaker: Alan Gatchell, Guilford Lake Park Manager</td>
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</tr>
<tr>
<td>3</td>
<td>FIELD TRIP: 1 - 5 pm; first group</td>
</tr>
<tr>
<td>5</td>
<td>FIELD TRIP: 9 am - 1 pm; second group</td>
</tr>
<tr>
<td>8</td>
<td>Consolidate field data</td>
</tr>
<tr>
<td></td>
<td>Ice, Wind, and Climate, Chapt. 10</td>
</tr>
<tr>
<td>10</td>
<td>cont.</td>
</tr>
<tr>
<td>15</td>
<td>Waste Disposal, Chapt. 16</td>
</tr>
<tr>
<td>17</td>
<td>cont.</td>
</tr>
<tr>
<td>22</td>
<td>Air Pollution, Chapt. 18</td>
</tr>
<tr>
<td>24</td>
<td>cont.</td>
</tr>
<tr>
<td>29</td>
<td>Group Presentations</td>
</tr>
<tr>
<td>May 1</td>
<td>cont.</td>
</tr>
<tr>
<td>7</td>
<td>Test III</td>
</tr>
</tbody>
</table>
Appendix 2

Excerpts from Environmental Geology Course Materials, Assignments, and Test Questions

This summary was prepared as part of a final report for an Ohio Environmental Education Fund grant. The grant funded further curricular development in my Environmental Geology course including stream analyses and printing costs for a student-generated informational pamphlet on Non-point Source Pollution management in the Guilford Lake watershed area. This is an update of a course curriculum developed in response to the 1990 Great Lakes Research Consortium Practicum for Applied Environmental Problem-Solving.

Environmental Geology Curriculum, Spring 1994

Developed in partial fulfillment of OEEF Grant 92MO71, Environmental Problem Solving

**Audience:** College freshmen and sophomores in Geology 21062, Environmental Geology, a three semester credit hour course offered at Kent State University, Salem Campus

**Summary:** Students were presented with the following project description at the beginning of the semester. They each chose an area of land use to research throughout the semester and, as a group, presented a group oral and individual written report on this area. During a class field trip to the watershed area, they took samples and measured stream discharge. The samples were analyzed at a professional laboratory and the results were used in the reports to compare the impact of different land uses on water quality. Smaller written assignments tied appropriate course content materials to the group project.

Land Use and Water Quality--Group Project Description

Guilford Lake State Park is heavily used for recreational activity, including boating, swimming, and fishing. All these applications require good water quality and minimal sediment accumulation, but the lake is impacted by increased sediment and nutrient run-off from the watershed. Several potential sources are likely, and remedial measures are known that would reduce the impact of sediment from each of these sources. However, the state only has a limited amount of money and must decide which measure would be the most cost-effective. You have been hired to calculate the actual volume of sediment and nutrients from six areas, predict the impact from those areas on lake-water quality, and compare the costs of mitigation. Evaluation will involve actual field measurement of stream discharge, sediment load, and nutrient content at upstream and downstream points near each source.

You will be divided into groups according to land use.

- Group 1 will investigate a cropped field and a feedlot, research the types of soils using published soil descriptions, and investigate agricultural best management practices.
- Group 2 will measure sediment runoff from an abandoned coal mine and investigate the types of reclamation procedures which would be most effective.
- Group 3 will look at nutrient contribution from a residential area that relies on private septic systems, and will look at plans for a proposed sewer extension.
- Group 4 will conduct measurements of sediment contribution from a construction site near the lake, and investigate best management practices for construction sites.
Group 5 will investigate the contributions from a wetland area that drains to the lake, and research other contributions of wetland area.

Group 6 will investigate contaminant contributions from residences, lawns, and recreational areas.

Group 7 will look at the lake itself, including the causes of eutrophication, the importance of water quality in lake-use, and contributions from recreational use.

Simple computer modeling and research of published data will give further data on the contributions from each type of land use to water quality in the area. After each group has estimated the sediment and nutrient contribution from its area, one class period will be devoted to integrating the data. The class will then decide on a recommendation to the state ranking the areas as to which is the largest contribution of sediment and nutrients to the lake, and which mitigation method would be most cost-effective.

Each group will have three or four members. Groups will elect a coordinator, a reporter, and a librarian. Members will divide the topic into sections. Each member will select a section and will complete an individually graded paper on that section. The individual report will be worth ten written assignments. The group will present a group oral report and a one page group summary. These will be given a group grade, each worth five written assignments. The group summary (including photographs, sketches, maps, and graphs) will be available for the use of watershed groups who are interested in water quality issues. The individual report must be documented with complete references to published materials and personal interviews. We will use parenthetical references within the text and standard MLA style for the bibliography.
Your group members are given below. Introduce yourselves and choose a coordinator, reporter, and librarian. Indicate your choices on this list. Using the reference materials available in the box, brainstorm a list of more detailed topics and terms within your group topic. These can include terms you need to look up, key words which might be used in a library search, sources of pollution from this type of land use, or pending legislation dealing with that land use. List these below and keep a copy for yourselves. Return this sheet when you are finished. You might want to use any extra time for library research.

- Wetlands
- Agricultural
- Construction
  - Residential; septic systems and household wastes

Hint: A proposed sewer line extension to serve the villages of Winona, Newgarden, Hanoverton, and Kensington is very controversial. Some research on this project, especially regulations for new septic permits and the legal process of putting in the extension, may be interesting.

- Mining
- Residential and recreational; lawns, golf courses
- Water sources
- Wells and wellhead protection

Assignment 1 due February 15, 1994
As a group, generate a list of terms and topics which you need to investigate or use in literature searches. This is the first stage in dividing up your group topic into individual pieces that fit together nicely and support each other.

Assignment 2 due February 17, 1994
Prepare an "annotated bibliography" abstract and reference to the Guilford Lake report given to each group. Summarize the report in one page, choosing the information you think is most important. Also write down the complete reference to this report using standard MLA style.

Assignment 3 due February 22, 1994
Each person should take the list of topics to the library and use the CD-ROM, Catalyst, and other search methods to find a book or article concerning your land use. Prepare an abstract of one article or source of information about your topic (one page, maximum). It should include the most important information in the report. In the future, you will share several of these within your group as a way of dividing the topic and research time.

Continue to work on the research throughout the rest of the semester. You will need to maintain communication with your group to avoid duplication and to share ideas. This will be done for a few minutes at the end of each class session and at other times that you should schedule at your own convenience.

Reminder:
Group oral presentations will be held April 20 and 22. Your individual written reports will be due the same day.
REQUIRED Field Trip is scheduled for March 10, 1994

Assignment 4 due March 15, 1994
   A. During the field trip, measure the discharge of the stream at your data site. Submit data and calculations.
   B. Write a narrative of how you measured the discharge. After class, go to the Writer's Workshop and have your narrative read and critiqued. Revise if needed.

Assignment 5 due March 22, 1994
   Using the soil survey maps of the Guilford Lake area, select a soil type and list some limitations for that soil on your type of land use. Discuss adjustments which may be necessary.

Assignment 6 due April 26, 1994
   You have the authority to dispense $100,000 in funds designed to improve water quality in the Guilford Lake watershed area. Allocate these funds and justify why you think these expenditures will produce the most benefit.
Excerpts from the final report for an Ohio Environmental Education Fund grant. The grant funded curricular development for implementation of the Problem Solving units in Environmental Geology, including sample analyses costs, printing a student-generated pamphlet, and personnel assistance in developing outdoor laboratory at local public schools.

**Progress Report: Ohio Environmental Education Fund**

92MO71, Environmental Problem Solving, May, 1994

The main goals of the project are to develop college curricula to teach Environmental Geology through actual field study of a local problem area and to apply that curricula to teacher education classes and individual outreach contacts. A secondary goal is to educate the public by student research and presentations.

Objectives include increased understanding of environmental concepts by college students, primary and secondary teachers, and the public, improved curricula which interests students in environmental science at all ages, and increased public awareness of the relationship between individual actions and water quality.

Activities include coursework that emphasizes local application of geologic principles, field trips where data is collected, and interpretation of that data as part of course content. Students wrote and published an informational brochure emphasizing land use and water quality with emphasis on non-point source pollution and watershed protection. Teachers were exposed to these curricula in individual outreach assistance to develop environmental education experiences in their own areas.

This is the third and last reporting period of the project. One fall semester, 1993, and two spring semester, 1994, Environmental Geology classes were the third and fourth semesters, respectively, completed using curricula developed with this project. The fall semester class completed three fact sheets and the second section of an informational leaflet which emphasized the importance of wetlands, new regulations on construction, and wellhead protection within the watershed. Students from the spring semester classes utilized and distributed these materials, together with the first section of the leaflet, which emphasized residential land use, in their projects. Data collected by the students was presented to the public in a watershed meeting organized by the Guilford Civic Association. Outreach contacts for the development of outdoor classrooms and problem solving curricula for local schools are continuing.

**Evaluation**

Students were given a pre-test designed to identify areas which need more scientific background and awareness. Later tests demonstrated that awareness and knowledge had increased substantially. Written and oral comments received about the project also were very positive. Students' attitudes about the project are overwhelmingly enthusiastic, and it appears that the project has successfully accomplished its goal of teaching environmental sciences by actual problem solving methods.
Excerpts from a graduate credit workshop proposal. This course, a two-credit-hour education summer workshop, presented the concept of a problem-solving approach to ten area public school teachers during the summer of 1992. Stream sample analyses were funded by the OEEF grant and were included in later Environmental Geology class projects and published reports.

The problem solving approach has proven to be very successful in my Environmental Geology class and it promises to be an excellent tool to introduce environmental awareness and concepts to local educators and their students as well. I incorporated problem solving into my own curriculum after I attended a National Science Foundation faculty practicum on the concept in 1990. It is very successful not only in teaching content material in all aspects of science and other disciplines but also in developing enthusiasm in the students about the process of investigation in general. The combination of our outdoor facilities here at Salem and the problem solving approach seems ideal to introduce teachers to environmental studies.

Workshop on the Outdoor Classroom and Environmental Problem Solving
Kent State University, Salem Campus: July 6 to 10, 1992

Monday Morning
Introduction to Outdoor Education
Problem Solving as a tool; Sampling rationale; Observation as key method
Afternoon; outside at KSU Salem
Sampling techniques for beginners
Measuring stream flow rate; Recording data

Tuesday Morning
Problems in water quality
Land use and quality changes; Eutrophication as an example; slides
Afternoon
Guilford Lake field trip
Stream samples in the Guilford Lake watershed; canal visit; water and sewage plants

Wednesday Morning
Using air photos and soil maps
Outdoor Education as intro. to local history; canals, mines, industry
The Man Who Planted Trees video; Group brain-storming on history sites
Afternoon
Outside at KSU Salem
Soil erosion and formation
Bio-indicators of water quality (Counting Critters); Ground water models; Glaciation

Thursday Morning
Environmental Impact Assessment as tool
Small group session on "what-if" problems; Social and political problems of environment
Afternoon
Outside at KSU Salem
Acid Rain demonstrations and sampling
Resources; Investigating grants; Nobles Pond and Jackson Middle School

**Friday Morning**
Group work on curriculum development; Peer teaching of problem-solving

**Afternoon**
Participants’ presentation of Guilford data

Follow-up activity: A grant application has been submitted to the Ohio Environmental Education Fund to provide participants with personal assistance for planning environmental problems or outdoor labs in their own school systems. If funding is received, this assistance will be available through the summer and the 92-93 year, and will be concluded by a group meeting on the success of the project.
Excerpts from a grant to fund capital improvements to improve access to the Outdoor Classroom facilities at Kent State Salem. Grant was received in the amount of $20,000; sampling platform and boardwalks are now installed and in use by college classes as well as visiting public schools.

**Appalachian Public Facilities Improvements Project**

**Sampling Platform and trails; Kent Salem**

**Project Description; December, 1995**

The project is sponsored and will be owned by the Salem Regional Campus of Kent State University, which is located in Salem, northern Columbiana County. The Campus includes an Outdoor Classroom area with a 3.5 acre pond, natural forest, arboretum, and demonstration plantings. A floating platform will be purchased at a cost of about $10,000 from Ohio Penal Industries and installed in the pond. The platform is 20 feet wide with a 30 feet long ramp connecting it to the shore. A portion of an existing trail in the Outdoor Classroom will be paved for handicapped access. A section of trail 10 feet wide and 5,000 feet long will be paved 3 inches thick, at a cost of $10,000. A bridge and a section of boardwalk about 400 feet long will be constructed using recycled plastic lumber to allow access to a stream and wetland area. The Campus will provide labor for initial site preparation, engineering, and planning, at a total cost of $24,000. The Salem Rotary Club is involved in fund raising for paving costs for this area as well as an adjacent jogging trail.

The platform and trails will be utilized by students in Biology, Botany, Geology, Environmental Management Technology and Horticulture Technology to learn water, biota, and sediment sampling techniques and to study aquatic organisms, and by pre-service science teachers to model active learning and cooperative learning techniques. At the present time, the Outdoor Classroom is used extensively by these groups, but access to the pond and some parts of the trail is difficult, especially in inclement weather. In addition, increased accessibility will enhance the use of the Classroom by visiting primary and secondary schools. The Classroom emphasizes plant identification, local natural history, and plant and mineral resources, including historic use of lumber, maple syrup, clay, coal, and iron ore.

The project as a whole will enhance the use of the Outdoor Classroom as a teaching tool for all of the University science classes and will be particularly applicable for the Horticulture and Environmental Management Technology Programs. Direct experience with aquatic sampling techniques will especially increase the employment opportunities for students in Environmental Management, where a diversity of sampling experiences is essential.